KNOWLEDGE AND ATTITUDE OF EYE CARE WORKERS TOWARDS ELECTRONIC MEDICAL RECORDS IN A TERTIARY EYE FACILITY

Abstract

Electronic Medical Records (EMR) has been an integral part of patient management in the developed world but still gradually gaining popularity in the developing world. It was met with resistance by health workers in Nigeria though this is changing in the post COVID era. However, there still appears to be some resistance to its acceptance for different and sometimes justifiable reasons. The **aim** is to determine the knowledge and attitude towards EMR among eye health workers in a teaching hospital in South East Nigeria. The cross-sectional quantitative study was conducted among consenting consecutive eye care workers at Guinness Eye Centre, Onitsha aged≥ 18years from July to September, 2023. A pretested semi structured self-administered questionnaire was used. Information of interest were biodata, knowledge and attitude towards EMR. They were summarized into simple frequencies and percentages. Knowledge scores were grouped into good and poor using the blooms cut off for knowledge attitude and practice. Univariate and bivariate analysis were done and results represented in tables and charts with levels of significance placed at $p<0.05$. There was a total of 135 respondents; the mean age was 32.6 years ± 10 SD, male to female ratio of 1:1.1. The result showed good knowledge and positive attitude towards EMR (85.2% and 73.2% respectively) with younger age group, professional cadre and computer literacy found to be associated with good knowledge and positive attitude towards EMR in the population. The hospital/ clinic were the most common sources of EMR information.This study showed good knowledge and positive attitude toward EMR in the study population. It also suggested an association with younger age group, professional cadre and computer literacy.

Introduction

Medical records are an indispensable part of patient care. It is a document that gives a detailed account of a medical encounter with a patient and if done correctly, serves as an excellent source of historical record.[1] Documentation of health information is a key component of quality health care and the single most important reference in medico legal issue,[1,2]therefore emphasis on its correctness cannot be over emphasized. Paper based medical records and electronic medical records (EMR) are the popular means of health record keeping and, in our environment, it is advocated they are used to complement each other due to some peculiarities of resource limited settings. The EMR is gradually becoming popular and appears poised to replace paper based medical records in the near future which used to be the main method of record keeping in our environment.

Electronic medical record (EMR) is a systematic collection of electronically stored health information about individual patient and population in a digital format.[3,4] It has been reported that use of EMR in health care system can be transformational in the long run by saving costs, improving quality of service, reducing errors, save time, ensure confidentiality and sharing of relevant medical information.[5-13] EMR affords access to timely and accurate access to patient's information and this is essential for meeting the health care needs of a patient.[14,15] Also, in these days of Artificial Intelligence where a lot of original African data is needed to create required machine learning models, which are required to complement the efforts of stretched workforce in sub Saharan Africa, health systems need to adopt EMRs to aid better assembly of relevant databases.

In Nigeria, EMR is still in its early stages, and a number of public facilities are gradually embracing it. However, many hospitals still engage in manual record keeping which is inefficient, thus increasing patients waiting time and can be frustrating.[16] A number of challenges militate against its acceptance. These include but not limited to infrastructure gaps (computers, epileptic power supply, connectivity etc.), attitudes of health care workers, poor orientation, lack of training, resistance to change, security concerns and policy related issues.[7.17] Ndukwe and Ezeoha reported that just about 10% of Nigerian hospitals have embraced EMR.[18]This figure is expected to be higher as a good number of hospitals have adopted it since 2018.

A study in Tehran showed good knowledge among doctors, students and staff respectively to be 15.6%, 35.0% and 32.3%.[19]Mu'awiyyah *et al*[16] in Zaria reported that 31% of their study population had good knowledge of EMR, 96.9% had good perception with all (100%) having good attitude towards EMR. In another study in Jos by Afolaranmi*et al*[20] 82.9% and 73.2% respectively were aware of EMR and defined it correctly. In Oshogbo, south west Nigeria, Abodunrin and Akande ~~in~~ reported that 91.6% of respondents were in support of e-health practice in Nigeria.[21]

Guinness Eye Centre Onitsha has not started using EMR at the moment. The purpose of this study is to assess the level of knowledge, and attitude toward the use of EMRs among eye care workers in Guinness Eye Centre (GEC), Onitsha (which is the ophthalmology department of Nnamdi Azikiwe University Teaching Hospital Nnewi and Nnamdi Azikiwe University Awka).

Methods

Design – This was a hospital-based cross-sectional study conducted among all cadres of eye care workers at the Guinness Eye Centre (GEC), Onitsha

Study population/area: The survey was conducted among eye care workers, working at GEC Onitsha. It is a stand-alone mono-specialty tertiary eye care facility which is located along the busy Awka road within the heart of Onitsha town.

Onitsha is metropolitan inland river port city which lies along the eastern bank of the river Niger on its course to the delta tributaries into the Atlantic Ocean. It a major commercial hub in Nigeria, a historic town and also known for education as it has notable institutions.

NB: for the purpose of this survey, we considered every professional group working in the ophthalmology department of this institution who use or are expected to use EMR at their respective service points. This is irrespective of their back ground training.

Sampling technique – convenience sampling, being a relatively small facility with about 180 staff, we targeted to enroll all consenting staff in the centre by convenience sampling method over a three-month period. No prior sample size shall be calculated for the above stated reason.

Ethical Clearance – Ethical clearance for the study was sought and obtained from the ethics and research committee of Chukwuemeka Odumegwu Ojukwu University Teaching Hospital Awka, Reference Number COOUTH/CMAC/ETH.C/VOL.1/FN:04/294. A written informed consent was obtained from the respondents after explaining the objectives and method of the study to them. The explanation was also provided on the consent form.

Data Collection – A semi structured, self-administered questionnaire was used to collect the data. It has 3 sections as follows; A- socio-demographic information, B- knowledge on electronic medical records, C- attitude towards use of EMR The questionnaire was adopted from a previous study among health workers in a teaching hospital in northern Nigeria, it has been pretested and standardized.[16] The data was collected over a two-week period.

Grading of Response – the definition of EMR was considered correct if respondents provided information that contained: electronic record of health information of ~~and~~ individual created, compiled, managed and used by authorized health care providers in an institution.[22,23]

Data Management/Analysis – The data was originally entered into an excel sheet and then transferred to a a statistical software (IBM SPSS Version 25) for statistical analysis after it was cleaned. Frequency distribution tables were generated for all categorical variables and the results were represented using simple proportions. The mean and standard deviation calculated and computed for quantitative variables. Bivariate analysis was conducted to test the associations between independent and outcome variables at a 95% confidence interval and statistical significance was set at $p < 0.05$.

Results

A total of 150 questionnaires were distributed and 135 were fully filled and returned, indicating a response rate of 90%. Incomplete filling and loss of some questionnaires accounted for the 10% attrition.

The population was made of 71 (52.6%) females and 64 (47.4%) males with a male to female ratio of 1:1.1. The age range of the population was 18 – 59 years with a mean age of 32.6 years $\pm$ 10.51 SD. The modal age group was 30 – 39 years which accounted for 30.4% of the total population (Table 1).

Approximately 90% agree that EMR will make patient management and follow up easier and 87% believe it should be introduced into the country's health care system. However, 23.0% are of the opinion that the introduction of EMR should be resisted while 24.4% claim it will be detrimental to health in the long run (table 3). Overall, majority 85.5 and 79.0% respectively have good knowledge and good attitude towards EMR.

Table 1: Socio-demographic characteristics of respondents (n = 135)

Socio-demographic characteristics	**Frequency**	**Percent**

Age range (in years)		
<20	3	2.2
20 – 29	34	25.2
30 – 39	41	30.4
40 – 49	39	28.9
≥ 50	18	13.3
Mean age = 32.6 years 10.51 SD		
Sex		
Male	64	47.4
Female	71	52.6
Marital Status		
Single	95	70.4
Married	40	29.6
Religion		
Christianity	133	98.7
Traditional	2	1.3
Professional Cadre		
Ophthalmologist	13	9.6

Ophthalmic nurse	30	22.2
Optometrist	12	8.9
Admin/Account staff	45	33.3
Medical record	15	11.1
Optician	6	4.4
Pharmacist	5	3.7
Lab Scientist	9	6.7
Years of Experience		
< 5	44	32.6
5 – 9	36	26.7
≥ 10	53	40.7
Computer Competency		
Computer trained/ Literate		
Yes	91	67.4
No	44	32.6

Table 2: Knowledge of respondents on Electronic Medical Record

Knowledge Areas	Frequency	Percent
Definition of EMR as a digital record of patient's clinical data, management plan and treatment	93	73.3
Don't know	42	26.7
Previous training on EMR		
Yes	36	27.0
No	99	73.0
Use of EMR		
Appointment scheduling Software	20	14.8
Charting Software	14	10.4
Compliance tracking	20	14.8
Electronic prescription	25	18.3
Telemedicine	33	24.3
Don't Know	23	17.4
Components of EMR		
Nursing Care	15	11.3
Clinical	29	21.7

Laboratory	16	12.2
Radiology	16	12.2
Pharmacy	18	13.0
Billing	19	13.9
Don't know	21	15.7
Advantages of EMR		
Easy access to hospital data	28	20.9
Quick access to patients' information	19	13.9
Improved quality of care	13	9.6
More efficient and convenient	19	13.9
Reduces medical error	20	14.8
Saves time	26	19.1
Don't know	10	7.8
Disadvantages of EMR		
Epileptic power	26	19.2
Financial implication on patient	20	14.8
Financial implication on management	8	5.9
Risk of system crash	23	17.0
Risk of hacking/compromising the system	12	8.9

Time wasting due to network fluctuations	17	12.6
Training takes time	21	15.6
Don't know	8	5.9

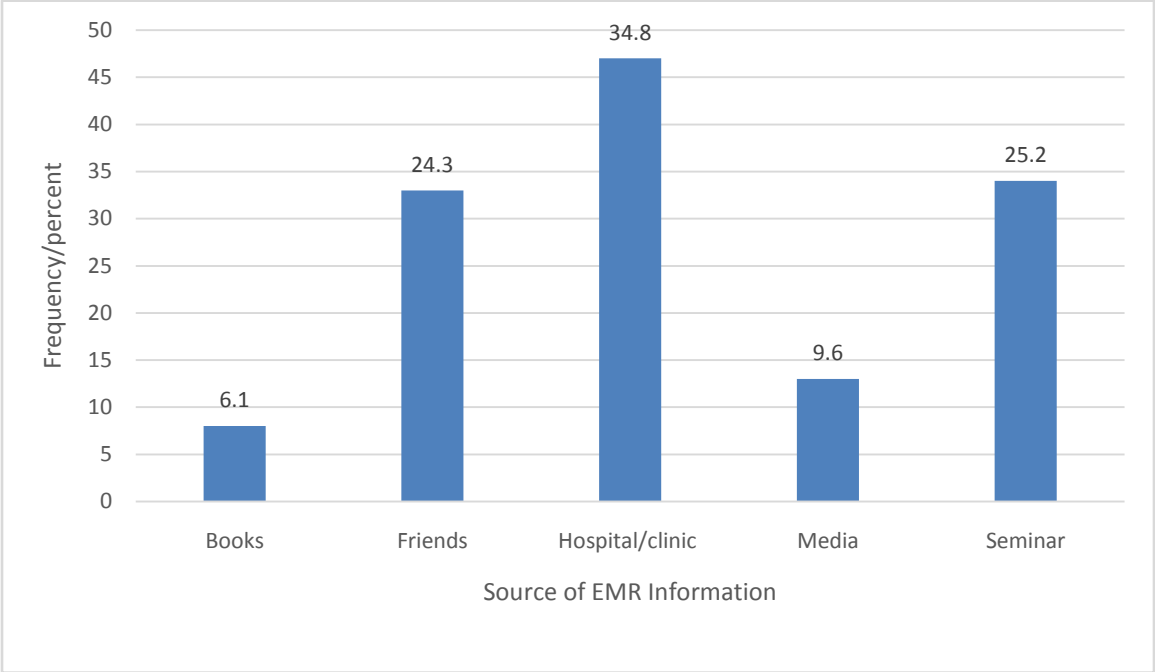

Figure 1: showing the sources of information about EMR in the population.

The figure shows that the place of work (hospital/clinic) was the main source. Other major sources were from seminars and discussion with friends. Just about 15% obtained the information from books and the media.

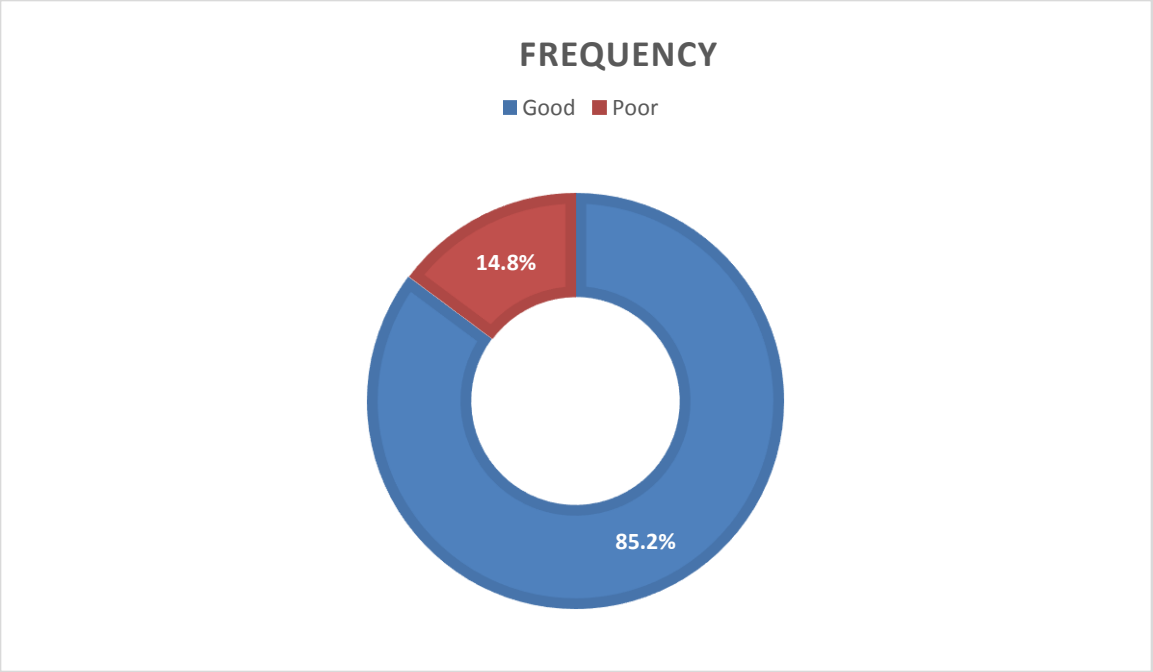

Figure 2: Showing the knowledge score of participants

Table 3: Showing the attitude of participant towards EMR

Responses on Attitude	**Frequency**	**Percent**
Makes patient management easier		
Yes	122	90.4
No	3	2.2
Don't Know	10	7.4
Potential for faster patient care		
Yes	118	87.4
No	4	3.0

Don’t Know	13	9.6
Prefer EMR than paper based		
Yes	112	83.0
No	7	5.2
Don’t Know	16	11.9
EMR necessary in the country’s health system		
Yes	117	86.7
No	5	3.7
Don’t Know	13	9.6
EMR Training should be encouraged for all health workers		
Yes	121	89.6
No	5	3.7
Don’t Know	9	6.7
EMR Training should be mandatory for all health workers		
Yes	91	67.4
No	20	14.8
Don’t Know	2484	17.8
Health workers should not be bothered about EMR	18	24.4
Yes	33	62.2

No		13.3
Don't Know		
Health workers should resist introduction of EMR	31	
Yes	90	23.0
No	14	66.7
Don't Know		10.4
EMR is detrimental to health care I the long run	33	24.4
Yes	60	44.4
No	42	31.1
Don't Know		

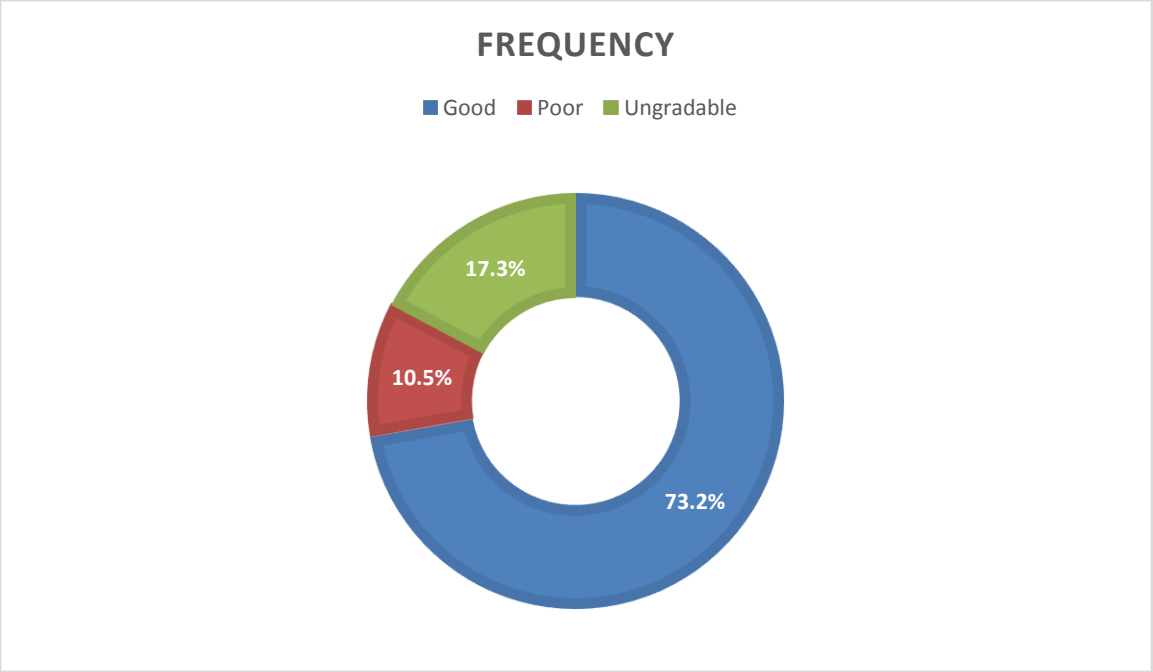

Fig 3: Showing the attitude score of participants

Table 4: shows the p-values obtained following bivariate analysis of sociodemographic characteristics of participants to show their associations with knowledge and attitude of participants towards EMR

Socio-demographic Characteristic Knowledge	Synonym of Electronic Health Record	Use of EMR	Components of EMR	Past EMR Training	Merits of EMR	Demerits of EMR
Age Group	0.980	0.206	***<0.001**	0.917	0.649	***0.050**
Professional cadre/group	0.756	*<	***0.001**	0.375	***0.018**	0.068

			0.001					
Years of Experience	0.252		0.569	0.244		0.299	0.971	0.960
Computer trained/Literate	***<0.001**		***<0.001**	***<0.001**		***<0.001**	***<0.001**	***<0.001**
Attitude	Makes work easier	Can make care faster	Faster than paper-based record	Needed for the health system	EMR training should be encouraged for all health workers	EMR should be mandatory for all health worker	Health Workers should not bother about EMR	EMR introduction should be resisted by health workers
Age Group	0.655	0.085	0.468	0.991	0.899	0.870	0.990	0.705
Professional cadre/group	0.467	***0.031**	0.444	0.651	0.639	0.315	***0.045**	***0.028**
Years of Experience	0.984	0.190	0.928	0.949	0.746	0.657	0.616	0.512

Computer trained/Literate	**<*0.001**	**<*0.001**	**<*0.001**	**< *0.001**	***< 0.001**	**< *0.001**	**< *0.001**	**< *0.001**
Attitude	EMR is detrimental to the health system							
Age Group	0.467							
Professional cadre/group	**<*0.001**							
Years of Experience	0.617							
Computer trained/Literate	**<*0.001**							

***- significant**

Discussion

About 85% of respondents in this study were aged between 20 – 49 years with over 35% of this group between 30 – 39 years. The is slightly less than 90.0% reported by Mu'awuiyyah*et al*[16] (2021) in Zaria but higher than 73.0% by Abodunrin *et al*[21] in Oshogbo. This may be principally because respondents in this age group constitute a large proportion of the working age group of the country. However, the slightly higher sample size in this study would account for the difference with the Zaria study. This age group, especially those between 20–39 years who accounted for 55.6% of the whole study population are also the age group more likely to take advantage of information and Communication technology (ICT) compared to the older age group irrespective of other demographic characteristics like gender, marital status, religion and professional group they belong. This is was also reflected by the fact that almost 70% of respondents were computer literate. This is consistent with the 75–84.4% reported in Zaria, 80.0% in Oshogbo and 89.7% in Tanzania and Ghana.[16,21,25] However, the higher sample size in this study may have accounted for the slight relative reduction in the proportion of computer literate respondents in this study, who were nonetheless still in the majority. Over 70% of respondents in this study were single while over

50% were females. This is similar to the Oshogbo study which is also in southern Nigeria but differed from the Zaria study which had male preponderance of 71% and 56.3% single population. Furthermore, Singles are more likely to have time to acquire ICT skill and apply them in the work place.

Most respondents were aware of EMR with hospitals/clinic, seminars and friends (Figure 1) being the most commons sources of this information. This is similar to the study in Zaria where about a third acquired this information from seminars but differed from the Oshogbo study where over 2/3rd acquired this information from colleagues. The finding of this study suggest that the hospital is a good source of health-related information, and effort should be made by stake holder in the hospital environment to provide fora for dissemination of health information to the hospital and outside community.

Over 85% of respondents have good knowledge. (Figure 2) This differs from what was obtained in Zaria, North-west Nigeria and Addiss Ababa where a third had good knowledge of EMR.[16,26] It is important to note that these two studies were both conducted in the pre-COVID era, unlike the index study. The pre-COVID era coincided with the time health records were in transition from manual to electronic. However, the digital revolution that followed the movement restriction of the COVID-19 era may have stimulated more proliferation and dissemination of EMR related information. This further collaborates finding of more information from the hospital/clinic reported by more of the respondents of this study.

The results of bivariate analysis (Chi square test) in table 4 suggests an association between demographic characteristics (age group, computer literacy and professional group/cadre) and knowledge of EMR especially advantage (p=0.018) and disadvantage of EMR (p=0.050). This is in agreement with a previous study in Benghazi which showed that doctors had better knowledge of the advantages ofEMR.[27] Younger health workers in Zaria also had better knowledge of EMR due to more exposure to computers while learning than the older participants who had less exposure to computer ~~in~~ during their schooldays.[16]

Respondents in this study also reported positive attitude towards implementation of EMR in the health system as was reported by almost 75% of the respondents. (figure 3) This agrees with the more recent study in ABUTH, Zaria (100%) and an earlier one in Oshogbo (91.6%), and Benghazi (96%).[16,21,27] But differed from an older study in Theran where 40.4% reported good attitude to EMR.[28] The good attitude in this study is thought to be due to

increased awareness of EMR among eye health workers. Again, the results suggest an association between professional group/cadre and computer literacy attitude to EMR. Possible sources of limitation in this study include total reliance on response of participants which could introduce some recall bias since their responses could not be independently verified and validated and our inability to carry out a multivariate analysis which is expected to take care of some confounders. This could not be done because of non-categorization of some variable of interest. Despite these this work seems to be the first of its kind among eye health workers in Nigeria, the largest EMR survey among health workers in Nigeria and the results obtained generally collaborate with results of previous similar studies in Nigeria and other parts of the world while subtle deviation from the previous findings was justifiable from the characteristics of the population.

Conclusion and Recommendations

This study which sought to explore knowledge and attitude toward the use of EMRs among eye care workers in Guinness Eye Centre (GEC) Onitsha showed good knowledge and a positive attitude to EMR among respondents while demographic characteristics of the population such as age group, professional cadres and computer literacy were associated with better knowledge of EMR. While we recommend that the management of NAUTH should organize seminars and workshop to bridge the EMR knowledge gap and wrong attitude towards EMR and also install EMR systems at GEC Onitsha for effective service delivery in the hospital.

Ethical Statement

Ethical approval was obtained from the Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka, with Reference Number COOUTH/CMAC/ETH.C/VOL.1/FN:04/294. Permission letter was granted from the Guinness Eye Centre, Onitsha, Nigeria.

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